# Cultural Perspectives of Environmental Assessment in Grays Harbor, Washington

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## Abstract

The cultural use of saltmarsh plants in estuaries provides a significant biological monitoring tool for environmental assessments. Recognition of natural resources as cultural resources provides a unique approach for resource management by integrating the foundations of science, law, and traditional ecological knowledge (TEK). Sweetgrass, *Schoenoplectus pungens*, is used by North American Natives as a material culture natural resource in the manufacture of baskets. The plant is a component, and participant, in highly complex estuarine ecosystem processes. Disruptions to ecosystem processes may be evidenced in *Sch. pungens* populations in Grays Harbor, Washington. Using TEK with science and law may improve resource management processes by recognizing the value and use of natural resources with a cultural value. This approach includes the human element as a part of the environment, similar to North American Native cultural value of the natural world. It is a holistic approach for estuarine management processes.

## Introduction

Native Americans use many different natural resources in cultural customs. In contemporary resource management, the knowledge of the use of these resources is limited. Native Americans use many wetlands plants and animals in culturally defined practices. Saltmarsh wetlands areas may be some of the most impacted areas from urbanization and industrial development. The saltmarsh plant sweetgrass, *Schoenoplectus pungens*, is used as a basket making material throughout its range where it is still available. The Skagit River delta in north Puget Sound, and Bowerman Basin in Grays Harbor are the two major areas remaining in Washington with large Sweetgrass populations. Both of these populations are in distress and the quality of the plant as a weaving material has declined. It is highly probable these conditions are an indication of cumulative environmental impact problems with future implications. Sweetgrass should occur where rivers enter marine bays. A few other locations have relatively small populations. In some cases, sweetgrass is being re-introduced to areas it was known to have occurred in the past.

A contemporary viewpoint of cultural resources in environmental assessment emphasizes historical elements without recognition of other living cultures' perceptions. Different perceptions of cultural resources have prevented effective management of natural resources that have cultural value. Natural resources used in material culture and subsistence customs maintain cultural value. Inclusion of natural resources as cultural resources in environmental assessment allows a consideration for their protection, and also their use as an effective biological monitoring tool.

The following discussion is based on research conducted for a master's thesis (Ryan 2000). An examination of environmental assessment for area projects was conducted in search of impacts directly related to Sweetgrass in Bowerman Basin. The history of environmental impact in Grays Harbor is extensive and spans over a century of area development. Environmental assessments have occurred since environmental legislation; however, the descriptions of cultural resources are limited in scope. Sweetgrass is a participant in highly complex functions of the estuarine ecosystem. It is an important component of estuarine fish and bird habitats. The historic activity, environmental laws, and resource management have had an impact on the biological condition of Sweetgrass. The cultural use of Sweetgrass and other plants is not included in environmental assessments to date. The use of Sweetgrass is extensive and continues today as it has for many centuries. The discussion concludes with the potential for using cultural resources as biological monitoring tools in environmental and resource management. The connections of ecosystem elements are exemplified by understanding the role of particular species within entire ecosystems, including human use.

# Grays Harbor Estuary

**Physical Estuary**
Grays Harbor is located on the outer coast of Washington state at the mouth of the Chehalis River system. Bowerman Basin is approximately 230 acres (94 hectares), and is part of the Grays Harbor National Wildlife Refuge (Refuge), approximately 1,500 acres (607 hectares), located in the Grays Harbor estuary (46E 59' 00" latitude, 123E 56' 35" longitude, Grays Harbor County). An extensive stand of *Sch. pungens* is on the north shore of Bowerman Basin (downstream right bank), inside the Refuge boundary.

Estuaries are complex in their physical, functional, biotic and abiotic elements. Estuaries are the result of geomorphic, climatic, and biological activity (Duxbury 1987). The physical and biotic processes are integrally linked. Geology, physical oceanography, and chemistry of the estuary are critical factors for the biotic communities (Day, Hall, Kemp, & Yáñez-Arancibia 1989; McLusky 1981). Grays Harbor is identified as a well-mixed estuary during low river flow periods—July through September—and a stratified estuary during high river flow periods—November through March (Duxbury 1987; Josselyn, Zedler, & Griswold 1990; Officer 1976). The remaining four months may contain at least two periods of intermediary conditions with annual spring freshets, or increased precipitation variation from April to June. It is a drowned-river basin where the shallow water column provides more marine influence throughout the estuary due to tidal cycles (Duxbury 1987; Josselyn and others 1990). Seliskar and Gallagher (1983) classify Grays Harbor as a bar-built estuary where accumulated sand has restricted oceanic conditions at the mouth. Saltmarsh areas are a result of river sedimentation processes and marine sand-accretion events. Sediment and sand accumulation is the basis for continued dredging in the estuary.

**Habitats**
A saltmarsh is generally located near the reach of the mean higher high water tide inundation. It is subject to complex hydrologic activity from tides and river flow. Plants and animals have adapted to these unique conditions, including *Sch. pungens*. Larval and juvenile fish, and invertebrates utilize subsurface saltmarsh habitat for food forage and protection (McConnaughey & McConnaughey 1997; Simenstad, Fresh, & Salo 1982; Yáñez-Arancibia, Lara dominguez, & Pauly 1994). Trophic interactions within the saltmarsh provide food resources and predator protection that are not available in deepwater habitats. Above the water surface, saltmarsh areas provide cover and forage for birds and mammals. Grays Harbor is the last rest stop for many migrating birds along the Pacific flyway before the Copper River delta in Alaska (Herman & Bugler 1981). Twice each year, during spring and fall migrations, a spectacular assemblage of shorebirds invades Grays Harbor. At least 24 species of migratory birds use Grays Harbor on their route between South or Central America and the Arctic region. Their activity in the protected bay includes rest and foraging on the 55,000 amphipods/$m^2$ found in many areas (Refuge Plan 1990). Bowerman Basin provides 1–2 hours longer foraging time than other areas of Grays Harbor due to the extensive mudflats.

***Schoenoplectus pungens***
From a distance, a stand of sweetgrass may appear as grass although the plant is actually a stout triquetrous culm. Sweetgrass is a rhizomatous perennial that blooms from May to August and bears a dark-brown achene fruit (characteristic of *Sch. pungens* var. *badius*). The Pacific Northwest coastal occurrence of *Sch. pungens* is generally found in narrow bands at low elevations on partially exposed shorelines with sandy substrates (Dethier 1997; Ewing 1983, 1986). *Sch. pungens* has a wide range of adaptive character depending on local micro-environmental attributes (Deschênes & Sérodes 1985; Disraeli & Fonda 1978; Ewing 1983, 1986). The former name *Scirpus americanus* was incorrectly applied to sweetgrass (=*S. pungens*; Schuyler 1974). The *Scirpus* genus name has been replaced with *Schoenoplectus* (S. G. Smith 1995). The formal name for sweetgrass in Bowerman Basin is *Schoenoplectus pungens* (M. Vahl) Palla var. *badius* (K. Presl) S. G. Smith (Ryan 2000; S. G. Smith 1995).

**History**
Captain Charles F. Powell and Mr. R. A. Habersham conducted the first reconnaissance survey recorded for Grays Harbor navigation improvement (Habersham 1881; Powell 1882). No improvements were recommended for the Chehalis River at that time. Gravel bars and sand shoals were noted but were not considered obstructions to navigation. The Lower Chehalis River was capable of year round navigation for

vessels with drafts of 12 feet while the Upper Chehalis was limited to 3 feet because of shoals and gravel bars. Marine vessels had not encountered difficulty in navigating the entrance to the harbor. The survey report suggested that scraping the bars, installing wing-dams or both might be necessary in the future depending on commerce demand (Powell 1882). Apparently, commercial interests pursued navigation improvement shortly after the first survey report. Commerce in the area at that time was predominantly logging and related industry. Approval was granted in 1891 for Chehalis River modification with dikes and dredging to remove shoals. A report in 1895 approved construction of an 18,200-foot south jetty that would be self-scouring to improve harbor entrance channel navigation. A supplemental report was issued two months later with an additional request for a north jetty. Construction of the south jetty began by 1896, and ended in 1902 at a shorter length of 13,374 feet because of limited funds (Sturdevant 1933). The north jetty was approved for construction in 1906 and construction of an extension requested by 1910. The jetties were intended to increase water current flow through the channel at higher velocity to scour the accumulation of sediment and eliminate the need for dredging operations. A request for channel bar dredging was made and approved in 1916 due to the ineffective results of the jetty function. By 1933, both jetties needed reconstruction.

The U.S. Army Corps of Engineers (Corps) conducted dredging operations concomitant annually starting in 1891. The annual dredging started in 1910 and continues to the present time (Corps 1975, 1998a, 1998b, 1999a, 1999b; Sturdevant 1933). By 1975, the dredging program had evolved into 24.2 miles of annual maintenance with over 1.8 million cu yd per year removed. The more recent Fiscal Year 1999 dredge project estimated removal of 1.5 million cu yd from upstream areas (Crossover Reach to the Cow Point Reach) and 1.25 million cu yd from Downstream areas (Bar Channel Entrance, South Reach, and Outer Crossover Reach). Approximately 18 miles of river channel are currently dredged to maintain navigation from the harbor entrance to Cosmopolis. The project controlling depths, and the amount of dredged material, have increased over time depending on anticipated transportation needs. (Corps 1975, 1980, 1989, 1993, 1995, 1996, 1998a). The FY 1994–1999 projects all resulted in Environmental Assessments (EA) with corresponding Finding of No Significant Impact Statements (FONSI Corps, 1993, 1995, 1996, 1998a). The Corps has not been the only project operator removing sediment from the navigable areas. In 1910, the Port Commission of Grays Harbor agreed to maintain the inner harbor as a separate project and removed 13,000,000c.y. of sediment (Sturdevant 1933). The Port Commission initiated their own dredging projects in 1919 simultaneously with the Corps projects and cooperated in some projects (Corps 1989; Sturdevant 1933). The Port Commission is the sponsoring agency for the 1975 Corps' project Environmental Impact Statement (EIS) documents. Other areas or projects are included within the current project, such as the deepening of a vessel turning point in the harbor and docking slips, addition of pipe and cable installation projects, or beach nourishment (Corps 1980, 1998a, 1999a).

Records of dredge disposal sites were not well maintained during the project (Corps 1975, 1980). Most of the dredge spoil was deposited in wetlands, intertidal areas, and some deepwater inner harbor locations in Grays Harbor (Corps 1975). Hoquiam, Aberdeen, and Bowerman Field Airport are situated on dredge spoil deposits (Corps 1980; Grays Harbor Refuge Planning Team [Refuge Plan], 1990;U.S. Army Corps of Engineers, Harbor Lines Aberdeen-Hoquiam Map, 1940; U.S. Coast and Geodetic Survey #6195, 1886 and #6002, 1929).). The dredging and deposition of material affects water circulation and sedimentation processes in the estuary, which subsequently affects the biotic processes. Contaminated sediments are found in Grays Harbor and are a concern. Among some of the chemicals found are mercury, diethyl phthalate, and 2,3,7,8-tetrachlorinated dibenzo-p-dioxin (TCDD). The concentration levels are considered low although studies that are more recent may be available regarding their toxicity (Corps 1993). A Washington State Department of Ecology (DOE) Toxic Release Inventory Report (1995) states there are 396 pounds/mile$^2$ of toxic releases in Grays Harbor County and 1,080 pounds/mile$^2$ from neighboring Thurston County.

# Law

Environmental laws and programs serve to protect natural resources and the environment. The manner in which these laws are implemented determine the effectiveness of their intent. Most environmental laws are developed relatively recently in comparison to the length of time for environmental impact. Both state and federal laws have mechanisms established for protection of the nearshore environment.

**State Law**

The Washington Coastal Zone Management Program was the first state program authorized by the under the federal Coastal Zone Management Act (CZM 1972; Terich 1987). The program complies with the federal CZM administered by the Office of Coastal Resources Management, National Oceanic and Atmospheric Administration, Department of Commerce. The state Shorelines Management Act (SMA) established procedures for local government permit application, public notification and appeals. The enforcement authorities for the SMA are local government attorney's and the state attorney general. The state Department of Ecology reviews all development activities. The Shoreline Hearings Board and superior courts hear appeals from parties affected by permit approvals and denials. The State Environmental Policy Act (SEPA 1971) and the Environmental Coordination Procedures Act (ECPA 1973, RCW 90.62) both affect implementation of the Washington Coastal Zone Management Program. The policies and procedural directives of SEPA intend to provide environmental protection in proposed development projects. Areas of particular concern are listed in the SMA under the shorelines of statewide significance (RCW 90.58.030[2][e]). Among the exemptions under the state SMA were projects for construction or modification of navigational aids (RCW 90.58.030[3][e]). Other state regulation lies in the Washington State Constitution (1889). A harbor line system was established from the constitution and amendments to protect the state's navigable waterways. The actual water demarcation line and seaward is administered by the state Department of Natural Resources (DNR). The land surrounding the watermark is administered under the SMA.

**Federal Law**

In general, the laws are intended to protect special natural resources, and consider the socioeconomic values affected by particular projects. Emphasis on the Corps' environmental requirements is expressed here because of the Corps dredging operations in Grays Harbor. Passage of the Migratory Bird Hunting and Conservation Stamp Act (1934) provided the first recognition of significant value for wetlands. Many laws were enacted during the 1970s for protection of wetlands. The Clean Water Act § 404 (CWA; 1972 1977) is specifically intended to protect the wetlands areas of the 50 states. The 1987 amendments developed the National Estuary Program and intended to protect " . . . nationally significant estuaries that are threatened by pollution, development, or overuse."(p. 44, CEQ 1994–1995). The permit process under § 404 of the CWA (1972) and the Refuse Act (Rivers and Harbors Act 1889) is administered by the Corps.

The National Environmental Protection Act (NEPA 1969) provides EIS procedural directives and a public review process, as established by the Council on Environmental Quality (CEQ) regulations, to protect and enhance the environment. The implementation of NEPA for federal agencies is under Executive Order 11514 (1970) and amended by Executive Order 11991 (1977). The Corps' NEPA implementation policy (directed under the CEQ) states the Corps will preserve unique cultural and biological resources. Corps environmental management is to include protection to U.S. waters, including their adjacent wetlands, and apply the same environmental criteria to their projects and others (Bregman & Mackenthun 1992).

The NEPA procedures include development of an environmental assessment for projects with potential environmental impact. If environmental impact is certain, then an EIS is required. An EA has been the preferred method for project environmental assessment because it invariably leads to a FONSI, which are both forwarded to the EPA for review as required under the Clean Air Act (1967). The EA should be no longer than 15 pages, single-spaced. If an EIS is required, it is an appendix to a Corps' Main (Feasibility) Report for the project and must follow Corps Regulations Appendix EIS format. A chapter devoted to the Affected Environment is required in an EIS. The chapter should include major characteristics of the study area's natural and human resources to provide an understanding of physical, ecological, social, cultural, and economic conditions. The Affected Environment chapter should also include a discussion of Significant Resources: locations, quantities and qualities of these resources, and their significance. The EIS, as an

appendix to a Feasibility Report for a project, should not exceed 50 pages. Both the EA and EIS documents prepared by the Corps must include discussion of compliance to several environmental laws. Rarely are EA or EIS documents less than 50 pages. The types of Corps actions that require environmental assessment are legislation, feasibility studies, survey studies, post authorization advanced engineering and design (AE&D) planning reports, and continuing authorities studies under Flood Control or Rivers and Harbor Acts (Bregman & Mackenthun 1992). Several other laws are established explicitly to assist in protection of wetlands. The most proactive of all environmental laws is NEPA in its designated requirements.

**Treaty Law**

The federal treaty rights, and responsibility of the federal government, guarantees specific indigenous nations their continued use of traditional areas. Many of these areas now have jurisdictional boundaries that overlap for natural resource management and conservation. Some of the traditional areas are not managed for any resource use but may have jurisdictional boundaries, including private property ownership. Bowerman Basin is one of the remaining accessible areas for harvesting wetlands plants in Grays Harbor. Environmental law and resource management have not included protection, conservation, or maintenance of those natural resources associated with treaty-reserved rights. The Quinalt, Skokomish, and Chehalis are indigenous people of the Grays Harbor area. The Quinault Treaty (1856) maintains Quinalt reserved usual and accustomed hunting and gathering in the Chehalis River Basin. The Treaty of Point No Point (1855) maintains reserved usual and accustomed rights to Grays Harbor for Skokomish. Other legal instruments provide the Chehalis Nation with designation of usual and accustomed rights (see Ryan, 2000). A harvesting permit system for the Refuge may be in conflict with treaty (or other federal instrument) agreement that guarantees reserved right to harvest natural resources.

State agency with tribes has balanced precariously between federal mandate and case law. In the decisions from U.S. *v*. Washington (1974, 1980), Indian treaty reserved rights to fish at traditional locations were clarified. Judge George H. Boldt ruled that Indians possess the " . . . unequivocal right to fish at *all* 'usual and accustomed places,' whether on or off present reservations, . . ." (p. 223, Phase I). Co-management of natural resources by the state with tribes is required for implementation of Phase II of this decision (Institute for Natural Progress 1992). The result is accountability in decision-making processes that favor environmental stewardship and protection of natural resources.

## Missing the Point

**Environmental Assessments**

Cumulative environmental impact EA or EIS documents from the Corps projects are limited. The dredging operations projects are classified as routine maintenance of the original 1896 navigation improvement project. The laws suggest there should be thorough documentation for Grays Harbor maintenance dredging projects that include information about the social, cultural, and economic impacts, as well as the important biological and ecological aspects of the estuarine system. According to J. Smith and others (1976), *Sch. pungens* occurs in less than one acre, although saltmarsh areas cover 16% of the shoreline in Grays Harbor. A 1967 aerial photograph of Bowerman Basin indicates greater than one-acre area of *Sch. pungens* populations (Washington Department of Natural Resources aerial photograph archives). The 1976 base-line study was conducted after some 80 years of environmental impact to the area. J. Smith and others (1976) acknowledges that succession is not addressed because of development plans for the area. Saltmarshes are some of the most impacted areas in Grays Harbor (J. Smith and others 1976). The use of *Sch. pungens* is not addressed in Native American Concerns Section 3.4.4 in the 1989 EIS, or any other document.

**Cultural Use**

The Skokomish and Chehalis relate sweetgrass to their creation, existence, and other identities (Lamberson 1996; Levine & Merlan 1993). It is a culturally significant plant by itself. The sedge plant *Sch. Pungens* is commonly used as a weaving material, and has many other resourceful uses. Kwakwake'wakw use *Sch. Pungens* as dermatological and pediatric aids (Turner, Chapman, & Bell 1973). The Nitinaht use sweetgrass culms for the bottom and ribs in basketry, making rope, fishing line, mats and clothing (Turner, Thomas, Carlson, & Ogilvie 1982; Turner, Thompson, & Thompson 1990). Makah and other Coast Salish

weavers used this plant to construct baskets, mats, rugs, and bedding (Moerman 1998). Tsimshian and other northern groups used this plant for ornamental design and foundation in basketry (personal experience).

Coast Salish ethnography may not include specific plants either due to the paucity of material culture study, or because cultural use during some time periods was not as obvious due to other social conditions (Fleisher 1980; Gunther 1973; Reagan 1933). A common error in early ethnobotany is the misuse of English common names and incorrect scientific names (Norton & Gill 1981). Sedge plants, and others, are common artisan mediums in the Pacific Northwest (Turner 1979; Turner and others 1973, 1982, 1990; personal experience). Basketry techniques are practiced by many cultural groups of people and contemporary artisans. Plant availability is severely limited because of development and environmental impacts. In some cases, harvesters are now cultivating plants in their own backyard.

Specific cultural methodology is used to locate and harvest *Sch. Pungens*. Harvest techniques for most material culture natural resources requires considerable care for both preserving the plant, and maintaining structural integrity to the item. The technique used for harvesting *Sch. pungens* requires pulling the culm directly from its base with a popping sound. The remains of culm stubs after having been cut with a sharp instrument are a clear indication of improper harvest technique (Turner and others 1982, 1990; L. Jones, Quinalt, personal communication May, 2000; personal experience). The plants are then used in a cultural method to produce material culture objects. They are often placed in the mouth during use. Users are exposed to all of the chemical contaminants from pollution during harvest and use.

**Cultural Resources**

The cultural use of natural resources extends beyond subsistence use and includes other cultural expressions, such as material culture. Some material culture objects are used in traditional subsistence activity or preservation of cultural expression. The uses of natural resources by specific cultural groups of people comprise elements of that culture. Natural resource elements used for cultural expression constitute resources for that culture. These natural resources identified as cultural resources allow their inclusion in environmental assessment. The identification of these cultural resources provides a holistic approach to monitoring complex interactions of ecosystems. It also provides protection to natural resources important in treaty-reserved rights.

# Conclusion

The environmental impacts to wetlands areas are extensive throughout Washington State. The problems associated with these impacts are exemplified *Sch. pungens* in Bowerman Basin. Very little information is documented about the use of natural resources from nearshore environments. The use of plants and animals from these areas continue as they have for centuries by area indigenous people. Information on the ecological aspects of natural resources is embedded in the traditional knowledge. The use of natural resources as cultural resources effectively includes them in current management and decision-making processes. It enables an integration of science, law and natural resource management with a common element.

The conditions in Bowerman Basin come from a history of development impact. Building the spit that creates Bowerman Basin and water withdrawals from the Chehalis River system reduce the freshwater flow over the saltmarsh that *Sch. pungens* requires. Two culverts discharge stormwater directly onto the *Sch. pungens* beds at Bowerman Basin and appear to cause erosion, loss of habitat, and possibly high contamination. The plants are showing signs of degraded conditions as a weaving material. The population is showing signs of patchy distribution and declining condition. It may also take up contaminants from industrial pollution, storm runoff, and sewage drainage. Future conditions of this plant population are unpredictable at this time. If it is lost, then it is a loss of significant juvenile salmonid and bird habitats, and estuary functions. Its loss has huge implications for the people of the Chehalis River basin, particularly for the Chehalis, Quinalt, and Skokomish.

Channel dredging and jetty extension are controversial issues in the area (CRC 1999). Erosion impacts within and near Grays Harbor may be a direct result of channel maintenance. Removal of sediment and

altering the natural conditions provides potential for changes in marine influence and estuarine functions. Ecosystem changes are also observed by operators of local area oyster enterprises.

**Biological Monitoring**

Estuary processes are a feedback loop with all components interacting and affecting one another. Specific environmental cause and effect studies for *Sch. pungens* populations in Grays Harbor do not exist. A chronological account of *Sch. pungens* conditions in Grays Harbor is inaccurate to use as baseline information (J. Smith and others 1976). Long-term biological data sets are needed for many estuarine systems (Teal & Howes 1996). Local area Chehalis, Quinault, and Skokomish knowledge may provide historical information for plant location and conditions.

Consistent use of natural resources provides observations of other phenomena within the environment, particularly over time. Most monitoring programs focus on chemical testing as indicators of environmental impact (Karr & Chu 1999). Some conclusive tests have caused change to correct problems in some areas, such as dredge disposal site selection (Corps 1989, 1990). Another method of environmental monitoring must be considered to understand the interactions of environmental impact. Cultural uses of natural resources provide an effective biological monitoring tool for environmental assessments.

**Legal Protection**

Interestingly, the state and federal laws provide instruments for protection of natural resources and environments. The SMA outlines protection for areas of particular concern for resources considered to be of greater than local significance, or may have a resource being sought by ostensibly incompatible users. Examples incompatible natural resource use often overlooked are pollution and water withdrawal.

Material culture objects are unique expressions of cultural adaptation to specific natural environments. These objects are products of culture that were utilitarian in a survival lifestyle, and are an extension of culture. The natural resources used to produce material culture, or are used in subsistence, represent elements of culture and are cultural resources. The implementation of NEPA should encompass the important aspects of natural resources used as cultural resources.

**Benefits for the Resource, Management, Ecosystem and People**

Natural resource availability, accessibility, and quality are issues of concern as environmental degradation consumes remaining natural habitat areas. The discussion presented here is meant to exemplify the complexity of estuarine systems and the inter-relatedness of all estuarine components, applicable law, cultural value, and resource management. Designation of natural resources as cultural resources provides their inclusion into existing environmental laws and establishes some criteria toward protection of natural resources in treaty reserved rights. Incorporation of humans as part of the environment may improve decision-making processes by recognizing the value and use of natural resources with a cultural value. Natural resource management may be more effective by recognizing the importance of humans as a part of the environment, similar to North American Native cultural value of the natural world.

An alternative location for harvesting *Sch. pungens* has historically been in Puget Sound. The *Sch. pungens* populations in Puget Sound also have problems, including exotic plant invasion. Knowing who uses natural resources, what those resources are, and their location, provides a rubric for understanding the local ecological conditions. A clear focus for protection measures centers on the use of specific elements, and their unique associated habitat conditions. The Quinalt Museum has records of prehistoric and contemporary use of *Sch. pungens*. Quinalt and others continue to harvest this plant in a traditional manner (L. Jones, Quinalt, personal communication May 2000). This valuable knowledge provides a basis for restoration of natural resources and their environments.

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